1. An electrically conductive composition which comprises:

a plurality of polymeric complexes; each polymeric complex comprising:

a strand of a π-conjugated polymer; and

a strand of a polyelectrolyte, the polyelectrolyte being non-covalently bonded to the π-conjugated polymer and having at least one reactive functional group, the reactive functional group facilitating the cross-linkage between the polymeric complexes when the complexes are heated.

2. The composition of claim 1 wherein the π-conjugated polymer is selected from the group consisting of polyaniline, polypyrrole, polyacetylene and polythiophene.

3. The composition of claim 2 wherein the polyelectrolyte is selected from the group consisting of poly(butadiene-co-maleic acid), poly(vinylmethylether-co-maleic acid), poly(acrylic acid), poly(ethylmethacrylate-co-acrylic acid) and poly(acrylamide-co-acrylic acid).

4. The composition of 3 wherein the polyelectrolyte has a backbone and the functional group comprises:

at least one unsaturated double bond in the polymer backbone of the polyelectrolyte.

5. The composition of claim 4 wherein the functional group comprises at least one pendent group selected from the group consisting of carboxylic acid groups, hydroxy groups, amine groups, amide groups , nitrile groups, aldehyde groups and ketone groups.

6. The composition of claim 5 wherein there are at least two functional groups and each functional group reacts with each other or optionally with each other and a functional group from other polymeric complexes or optionally with each other and with the functional groups of other polymeric complexes.

7. The composition of claim 6 wherein the polymeric complexes are water-borne or optionally are dispersible in organic solvents.